

The *Tube AD* is divided into 3 lengths, of which (as in ordinary ones) *BC* is to lengthen or contract, as the Object requires: But *AB* is here added, that at *A* you may put such *Eye-Glasses* as shall be thought most convenient, and to set them still at the distance most proper for them, *Indexes* or *Pointers*, which here are supposed to be at *B*, which length alters also in respect of divers persons Eyes. *E* is a Screw, by which the great *Tube* can be fixt so, as by the help of the Figures any smaller part of it can immediately be found, measuring only, or knowing the Divisions on *BC*, the distance of the *Obj^t-glass* from the *Pointers*. *F* is the *Angular* piece of Wood, that lies on the upper Screw of the *Rest*. This *Rest* is represented by *Fig. 5*.

As for a Description of the *Uses* of this ingeniously contrived and very curious *Engine*, the Reader is desired to look back to the before-alledged *Numb. 25*.

An Account

Of making a Dog draw his Breath exactly like a Wind-broken Horse, as it was devised and experimented by Dr. Richard Lower; with some of his Instructive Observations thereon.

This Experiment was made before the Royal Society, Octob. 17. 1667. after it had been tried by the Author in private some while before. The Account of it in his own words, is as follows.

AFTER I had often considered the manner and way of *Respiration*, and by many Observations been induced to believe, that the *Diaphragme* is the chief *Organ* thereof, I thought there could be no way more probable to try it, than by breaking the *Nerves*, by which its Motion is perform'd; which may be easily (as it was actually) done after the following manner.

First, picree the side of the Animal between the 6th and 7th Rib in the middle of the *Thorax*, just over against the Region of the Heart, with a small *Incision-knife*, passing the Knife but just into the Cavity of the Breast (which you may justly know by finding no resistance to the point of it); then take it out, and put in a *Director*, or a small Quill made like it, and thrust it in about an inch, directing the end of it toward the *Sternum*, close to the inside of the Breast. Then cut upon it about an inch on the *Inter-costal Muscles*; by which you may be secur'd from touching the
Lungs

Lungs with the point or edge of your Knife. This done, put in your finger, and with your nail separate the *Nerve*, which passeth along the side of the *Pericardium* toward the *Diaphragme*. Then put in a *Probe*, a little inverted at the end like a Hook, and apprehend the *Nerve*, and pull it to the Orifice of the Breast, and cut it off, and sew the hole up very close. Do the same on the other side, and presently let the Dog loose, and you will plainly see him draw his breath exactly like a *Wind-broken Horse*: Which yet you will see plainer, if you run him a little in a string after he is cut. But that any one may perform this Experiment the easier, let him first take notice, how the *Nerves* of the *Diaphragme* pass along on each side of the *Pericardium* in a dead Animal, before the Trial be attempted in a living one.

The most obvious Observations from this Experiment, are,

1. That the whole manner of *Respiration* is quite alter'd. For as in a sound Animal, in Inspiration the Belly swells by the lifting up the Bowels by the Contraction of the *Diaphragme*; and in Expiration the Belly falls by the Relaxing of the same: In a *wind-broken Dog* or *Horse* 'tis quite contrary; for in them it is to be seen plainly, that when they draw their breath, their Belly is drawn in very lank and small, and when they breath up, their Belly is relaxt and swells again.

2. It being certain, that the *Lungs* do not move of themselves at all, but wholly depend upon the Expansion of the *Thorax* by the *Intercostal Muscles*, and the *Diaphragme*; by this Experiment it doth appear, how much the single motion of either of them doth particularly contribute to *Respiration*. For all *Inspiration* being made by the Dilatation of the *Thorax*, and that Dilatation being caused partly by the *Intercostal Muscles* drawing up the Ribs, and partly at the same time the *Diaphragme* by its Contraction drawing downward the lower small Ribs to which 'tis joyn'd, and also lifting up the *Fiscera* of the lower Belly, by which they do jointly make all the space they can for the Air to come in and distend the *Lungs*: It must hence necessarily follow, that the *Intercostal Muscles* and the *Diaphragme* being constituted for two distant *Employments* (though both to the same end) and neither being able to perform the others Office, where one ceaseth from its work, the other for the exigence of Nature must take more pains to supply

supply the others defect : Which is very evident to be seen ; for the *Diaphragme* being made useles by loosing its *Nerves*, the *Intercostal Muscles* do dilate the Ribs much more than formerly, even to the utmost distance they can, when there is need for it ; as, when you make the Dog run a little after he is cut, or when you gallop a *wind-broken* Horse, doth manifestly appear.

3. The manner of Respiration being the same in a Dog, whose *Diaphragme Nerves* are cut, and in a *wind-broken* Horse, 'tis more than probable, that the Cause may be as nearly the same, as the Signs are ; and that, though there may be other faults found in the *Lungs* of such Creatures, yet 'tis very likely, they may be induced from the *weakness* of Respiration, but that they had their occasion from the Relaxation or Rupture of the *Nerves* of the *Diaphragme* at first ; which will seem more credible, if we remember, that by the straining of the Midriff too much (by which the *Nerves* may be quite broken or stretcht beyond their proper tone) most commonly that accident happens.

Anatomical Observations on a Humane Body, dead of odd Diseases ; as they were communicated by Dr. Nathanael Fairfax.

A Young Maid of *Rumborough* in *Suffolk*, when she was about thirteen years of Age, took *Chalybeats* for the Green-sickness, and found some relief by it, but was after much pent in her wind. From 16 to 22 she much afflicted her self for the Death of her Father and Mother, and the misbehaviour of a Brother ; during which time, she had every year an *acute* Disease or two. At 18, she was very weakly, clogg'd in her Chest, and melancholy. If she went out in a windy day, she was fain to make hast in, for the Wind, *she said*, was ready to choak her. She was a very slow walker, going up Hill or up Stairs with much difficulty. She was now observed to be very thirsty, usuall drinking at Bed-time, and in the night too, sometimes ; else, *she said*, she should be choakt with drought. Between 21 and 22 of her age, going down stairs, she heard a frightful jolking in her Breast ; which she then made known to the rest of the house, who when she shew'd them the manner of it by shaking her Body, joyn'd all with her in the wonder, concluding (as most would have done by the noise) that her Breast was almost full of Water. She took several